

WHAT IS CLAIMED IS:

1. A method of detecting a malfunction during  
a die clamping step in an injection molding machine,  
the method being applied when performing die clamping  
by moving a movable platen toward a stationary platen,  
5 comprising:

taking a reference pattern showing a relation  
between a die clamping force and a position of the  
movable platen when die clamping is normally carried  
10 out;

setting one or more monitoring sections with  
respect to said position on the basis of the reference  
pattern, and setting, in advance, an allowable limit  
value of the die clamping force in the respective  
15 monitoring section in a form of a linear function of  
said position; and

monitoring the die clamping force in the  
respective monitoring section during the die clamping  
step and, when its value exceeds said allowable limit  
20 value, issuing an alarm.

2. The method according to claim 1, wherein said  
injection molding machine is equipped with an  
electrically driven die clamping unit using a toggle  
mechanism, and said die clamping force is calculated  
25 based on a torque of a motor for driving the toggle  
mechanism and expansion/contraction amount of the  
toggle mechanism.

3. A method of detecting a malfunction during a die clamping step in an injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

taking a reference pattern showing a relation between a die clamping force and a position of the movable platen when die clamping is normally carried out;

setting one or more monitoring sections with respect to said position on the basis of the reference pattern, and setting, in advance, an allowable limit value of the die clamping force in the respective monitoring section in a form of a linear function of said position; and

monitoring the die clamping force in the respective monitoring section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunction is detected; and issuing an alarm when the count of malfunctions detected in any monitoring section reaches a predetermined number for the section.

4. The method according to claim 3, wherein said injection molding machine is equipped with an electrically driven die clamping unit using a toggle mechanism, and said die clamping force is calculated

based on a torque of a motor for driving the toggle mechanism and expansion/contraction amount of the toggle mechanism.

5           5. A method of detecting a malfunction during  
a die clamping step in an injection molding machine,  
the method being applied when performing die clamping  
by moving a movable platen toward a stationary platen,  
comprising:

          taking a reference pattern showing a relation  
10       between a die clamping force and a position of the  
movable platen when die clamping is normally carried  
out;

          setting one or more monitoring sections with  
respect to said position on the basis of the reference  
15       pattern, and setting, in advance, an allowable limit  
value of the die clamping force in the respective  
monitoring section in a form of a linear function of  
said position; and

          monitoring the die clamping force in the  
20       respective monitoring section during the die clamping  
step and, when its value exceeds said allowable limit  
value, deciding that a malfunction occurs and counting  
the number of times that a malfunction is detected; and

          issuing an alarm when the count of malfunctions  
25       detected within a predetermined time reaches  
a predetermined number for the respective monitoring  
section.

6. The method according to claim 5, wherein said injection molding machine is equipped with an electrically driven die clamping unit using a toggle mechanism, and said die clamping force is calculated  
5 based on a torque of a motor for driving the toggle mechanism and expansion/contraction amount of the toggle mechanism.

7. A method of detecting a malfunction during a die clamping step in an injection molding machine,  
10 the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

taking a reference pattern showing a relation between a die clamping force and time when die clamping  
15 is normally carried out;

setting one or more monitoring sections with respect to said time on the basis of the reference pattern, and setting, in advance, an allowable limit value of the die clamping force in the respective  
20 monitoring section in a form of a linear function of said time; and

monitoring the die clamping force in the respective monitoring section during the die clamping step and, when its value exceeds said allowable limit  
25 value, issuing an alarm.

8. The method according to claim 7, wherein said injection molding machine is equipped with

an electrically driven die clamping unit using a toggle mechanism, and said die clamping force is calculated based on a torque of a motor for driving the toggle mechanism and expansion/contraction amount of the toggle mechanism.

9. A method of detecting a malfunction during a die clamping step in an injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

taking a reference pattern showing a relation between a die clamping force and time when die clamping is normally carried out;

setting one or more monitoring sections with respect to said time on the basis of the reference pattern, and setting, in advance, an allowable limit value of the die clamping force in the respective monitoring section in a form of a linear function of said time; and

monitoring the die clamping force in the respective monitoring section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunction is detected; and issuing an alarm when the count of malfunctions detected in any monitoring section reaches a predetermined number for the section.

10. The method according to claim 9, wherein  
said injection molding machine is equipped with  
an electrically driven die clamping unit using a toggle  
mechanism, and said die clamping force is calculated  
5 based on a torque of a motor for driving the toggle  
mechanism and expansion/contraction amount of the  
toggle mechanism.

11. A method of detecting a malfunction during  
a die clamping step in an injection molding machine,  
10 the method being applied when performing die clamping  
by moving a movable platen toward a stationary platen,  
comprising:

taking a reference pattern showing a relation  
between a die clamping force and time when die clamping  
15 is normally carried out;

setting one or more monitoring sections with  
respect to said time on the basis of the reference  
pattern, and setting, in advance, an allowable limit  
value of the die clamping force in the respective  
20 monitoring section in a form of a linear function of  
said time; and

monitoring the die clamping force in the  
respective monitoring section during the die clamping  
step and, when its value exceeds said allowable limit  
25 value, deciding that a malfunction occurs and counting  
the number of times that a malfunction is detected; and  
issuing an alarm when the count of malfunctions

detected within a predetermined time reaches  
a predetermined number for the respective monitoring  
section.

12. The method according to claim 11, wherein  
5 said injection molding machine is equipped with  
an electrically driven die clamping unit using a toggle  
mechanism, and said die clamping force is calculated  
based on a torque of a motor for driving the toggle  
mechanism and expansion/contraction amount of the  
10 toggle mechanism.

13. A method of detecting a malfunction during  
a die clamping step in a hydraulic injection molding  
machine, the method being applied when performing die  
clamping by moving a movable platen toward a stationary  
15 platen, comprising:

taking a reference pattern showing a relation  
between a hydraulic pressure of a movable platen  
driving hydraulic pump and a position of the movable  
platen when die clamping is normally carried out;

20 setting one or more monitoring sections with  
respect to said position on the basis of the reference  
pattern, and setting, in advance, an allowable limit  
value of the hydraulic pressure in the respective  
monitoring section in a form of a linear function of  
25 said position; and

monitoring the hydraulic pressure in the  
respective monitoring section during the die clamping

step and, when its value exceeds said allowable limit value, issuing an alarm.

14. A method of detecting a malfunction during a die clamping step in a hydraulic injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

taking a reference pattern showing a relation between a hydraulic pressure of a movable platen driving hydraulic pump and a position of the movable platen when die clamping is normally carried out;

setting one or more monitoring sections with respect to said position on the basis of the reference pattern, and setting, in advance, an allowable limit value of the hydraulic pressure in the respective monitoring section in a form of a linear function of said position; and

monitoring the hydraulic pressure in the respective monitoring section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunctions is detected; and

issuing an alarm when the count of malfunctions detected in any monitoring section reaches a predetermined number for the section.

15. A method of detecting a malfunction during



a die clamping step in a hydraulic injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

5           taking a reference pattern showing a relation between a hydraulic pressure of a movable platen driving hydraulic pump and a position of the movable platen when die clamping is normally carried out;

              setting one or more monitoring sections with  
10       respect to said position on the basis of the reference pattern, and setting, in advance, an allowable limit value of the hydraulic pressure in the respective monitoring section in a form of a linear function of said position; and

15           monitoring the hydraulic pressure in the respective monitoring section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunction is detected; and

20           issuing an alarm when the count of malfunctions detected within a predetermined time reaches a predetermined number for the respective monitoring section.

16. A method of detecting a malfunction during  
25       a die clamping step in a hydraulic injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary

platen, comprising:

5       taking a reference pattern showing a relation  
between a hydraulic pressure of a movable platen  
driving hydraulic pump and time when die clamping is  
normally carried out;

10       setting one or more monitoring sections with  
respect to said time on the basis of the reference  
pattern, and setting, in advance, an allowable limit  
value of the hydraulic pressure in the respective  
monitoring section in a form of a linear function of  
said time; and

15       monitoring the hydraulic pressure in the  
respective monitoring section during the die clamping  
step and, when its value exceeds said allowable limit  
value, issuing an alarm.

20       17. A method of detecting a malfunction during  
a die clamping step in a hydraulic injection molding  
machine, the method being applied when performing die  
clamping by moving a movable platen toward a stationary  
platen, comprising:

25       taking a reference pattern showing a relation  
between a hydraulic pressure of a movable platen  
driving hydraulic pump and time when die clamping is  
normally carried out;

      setting one or more monitoring sections with  
respect to said time on the basis of the reference  
pattern, and setting, in advance, an allowable limit

value of the hydraulic pressure in the respective monitoring section in a form of a linear function of said time; and

5        monitoring the hydraulic pressure in the respective section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunction is detected; and

10        issuing an alarm when the count of malfunctions detected in any monitoring section reaches a predetermined number for the section.

18. A method of detecting a malfunction during a die clamping step in a hydraulic injection molding machine, the method being applied when performing die clamping by moving a movable platen toward a stationary platen, comprising:

15        taking a reference pattern showing a relation between a hydraulic pressure of a movable platen driving hydraulic pump and time when die clamping is normally carried out;

20        setting one or more monitoring sections with respect to said time on the basis of the reference pattern, and setting, in advance, an allowable limit value of the hydraulic pressure in the respective monitoring section in a form of a linear function of said time; and

25        monitoring the hydraulic pressure in the

respective monitoring section during the die clamping step and, when its value exceeds said allowable limit value, deciding that a malfunction occurs and counting the number of times that a malfunction is detected; and

5           issuing an alarm when the count of malfunctions detected within a predetermined time reaches a predetermined number for the respective monitoring section.